

Date: Friday, 11/04/2008 4:32:16 PM
 User: Julie Lecocq

Process Sheet

Customer	: CU-DAR001 Dart Helicopters Services	Drawing Name	: 212/205 HIGH FED X-TUBE ASSEMBLY
Job Number	: 38571		
Estimate Number	: 10254		
P.O. Number	:	Part Number	: D212664101
This Issue	: 11/04/2008	S.O. No.	:
Prsht Rev.	: NC	Drawing Number	: D212-664-141 REV C
First Issue	: / /	Project Number	: N/A
Previous Run	: 38570	Drawing Revision	: C
	Type : LANDING GEAR	Material	:
Written By	:	Due Date	: 21/04/2008
Checked & Approved By	: <u>JD 08.4.11</u>	Qty:	1
Comment	: Est Rev:E 04.02.16 Reformat KJ/DS	Um:	Each
	Est Rev:F 06-03-29 Remove Coments on Pick List JLM		
	Est Rev:G 07-04-30 As per Rev C JLM		

Additional Product

SCRAP

Job Number:



Seq. #:	Machine Or Operation:	Description :
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1.0	DC	DOCUMENT CONTROL
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**Comment:** DOCUMENT CONTROL

Photocopy bluefile and create labels as per PPP D212-664-101CHG003

2.0	PACKAGING 1	PACKAGING RESOURCE #1
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**Comment:** PACKAGING RESOURCE #1

3.0	D212664101TRN	CROSSTUBE TURNING DETAIL
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**Comment:** Qty.: 1.0000 Each(s)/Unit Total: 1.0000 Each(s)

CROSSTUBE TURNING DETAIL

batch B38615

EL 8-5-5

4.0	BENDING	BENDING MACHINE - SKIDTUBES
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**Comment:** BENDING MACHINE

Bend tube as per Dwg D212-664-141 using CNC bender program 212-fw and Folio FT015

P70
EL 8-5-5


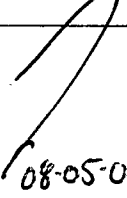


5.0	QC15	DIMENSIONAL CHECK OF X-TUBES
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**Comment:** DIMENSIONAL CHECK OF X-TUBES

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: D212-664-101 PAR #: PLH Fault Category: Prod/x-tube NCR: Yes No DQA: D Date: 08/05/06
 QA: N/C Closed: _____ Date: _____

NCR: <u>38571</u>		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			
08-05-05	4.0	Tube is severely over bent, and too high on one side, as per dim sheet. Center was over bent on the ends, resulting in the final bend on the 1st side over bending.		Scrap & destroyed - 2 bender operators to revise and brainstorm when creating bend programs.	EL 8-5-06	 08-05-06	 08/05/06	 08-05-06
		R.C: Employee was modifying the program to create an automatic to reduce time and improve the part.						

NOTE: Date & initial all entries

Date: Friday, 11/04/2008 4:32:16 PM
User: Julie Lecocq

Process Sheet

Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: 212/205 HIGH FED X-TUBE ASSEMBLY

Job Number: 38571

Part Number: D212664101

Job Number:



Seq. #:	Machine Or Operation:	Description :
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6.0	CROSSTUBES	CROSSTUBES RESOURCE 1
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Comment: LANDING GEAR RESOURCE 1

1-Drill pilot holes in tube as per Dwg D212-664-141 using drill Jig DT8548 & DT8549

2-Ream hole to finish size in tube as per Dwg D212-664-141 using drill Jig DT8548 & DT8549. Check dimensions between holes, both sides on both cuffs, to ensure alignment with saddle holes.

3-Deburr & Inspect for surface damage. Repair damage within limits as per Dwg D212-664-141

7.0	HAND FINISHING1	HAND FINISHING RESOURCE #1
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Comment: HAND FINISHING RESOURCE #1

Chemical Conversion Coat as per QSI 005 4.1 within 24 hours of bending and drilling

8.0	QC5	INSPECT WORK TO CURRENT STEP
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Comment: INSPECT WORK TO CURRENT STEP

9.0	OUTSIDE SERV.10	OUTSIDE SERVICES -skids
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Comment: Sub-Contracting OUTSIDE SERVICES

Liquid Penetrant Inspection as per QSI 038

Issue P/O: _____

LPI as per ASTM 1417 Level 2

Attach copy of NDT results to work order

10.0	PACKAGING 1	PACKAGING RESOURCE #1
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Comment: PACKAGING RESOURCE #1

Inspect for transit damage Ensure copy of NDT results attached to work order.

11.0	QC5	INSPECT WORK TO CURRENT STEP
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Comment: Inspect for damage & ensure results are as per Dwg D212-664-141

12.0	SPRAY PAINTING	SPRAY PAINTING
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Comment: SPRAY PAINTING

1-Prime inside and outside crosstube as per QSI 005 4.2

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Date: Friday, 11/04/2008 4:32:16 PM
User: Julie Lecocq

Process Sheet

Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: 212/205 HIGH FED X-TUBE ASSEMBLY

Job Number: 38571

Part Number: D212664101

Job Number:



Seq. #:	Machine Or Operation:	Description :
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2-Paint outside crosstube with White Imron as per QSI 005 4.2

13.0

QC14

INSPECT SPRAY PAINT



Comment: Inspect Spray Paint

Then, Wrap in plastic bag to protect from scratches

14.0

D28931

Support



Comment: Qty.: 2.0000 Each(s)/Unit Total : 2.0000 Each(s)

Pick:

Qty Part number Description Batch

2 D2893-1 Support _____

15.0

D3595063450

RUBBER CUSHION



Comment: Qty.: 4.2000 Each(s)/Unit Total : 4.2000 Each(s)

Rubber Cushion (per sq ft)

.630" X 4.5" 4PCS

Batch: _____

16.0

MS2192025

Clamp(per MIL-DTL-8783C)



Comment: Qty.: 4.0000 Each(s)/Unit Total : 4.0000 Each(s)

Pick:

Qty Part number Description Batch

4 MS21920-25 Clamp _____

17.0

CROSSTUBES

CROSSTUBES RESOURCE 1



Comment: LANDING GEAR RESOURCE 1

1- Lightly scuff the bonded area using a 320 grit sand paper and clean the area with 41058 wash 'n' wipe

2-Install supports with magnobond as per QSI 015 Adhere for for 12 Hrs

A/R 6398 Magnobond Batch: _____

Expiry Date: _____

3-Install clamps as per Dwg D212-664-141. Torque clamps to 80-100 in lb.

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Date: Friday, 11/04/2008 4:32:16 PM
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Process Sheet

Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: 212/205 HIGH FED X-TUBE ASSEMBLY

Job Number: 38571

Part Number: D212664101

Job Number:



Seq. #:	Machine Or Operation:	Description :
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18.0

QC5

INSPECT WORK TO CURRENT STEP



Comment: INSPECT WORK TO CURRENT STEP

19.0

PACKAGING 1

PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1
Pick Packing Kit

20.0

D34281

Placard



Comment: Qty.: 1.0000 Each(s)/Unit Total : 1.0000 Each(s)
PLACARD
Batch: _____

21.0

AN635A

BOLT



Comment: Qty.: 4.0000 Each(s)/Unit Total : 4.0000 Each(s)
Bolt
Batch: _____

22.0

AN636A

Bolt



Comment: Qty.: 4.0000 Each(s)/Unit Total : 4.0000 Each(s)
Bolt
Batch: _____

23.0

AN960JD616

Washer



Comment: Qty.: 18.0000 Each(s)/Unit Total : 18.0000 Each(s)
Washer
Batch: _____

24.0

MS21042L6

Nut



Comment: Qty.: 6.0000 Each(s)/Unit Total : 6.0000 Each(s)
Nut
Batch: _____

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

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Job Number: 38571

Part Number: D212664101

Job Number:



Seq. #:	Machine Or Operation:	Description :
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25.0

QC4

INSPECT 100% KITS FOR COMPLETENESS



Comment: INSPECT 100% KITS FOR COMPLETENESS

26.0

PACKAGING 1

PACKAGING RESOURCE #1



Comment: HAND FINISHING RESOURCE #1

Identify and pack for shipping as per PPP D212-664-101

27.0

QC21

FINAL INSPECTION/W/O RELEASE



Comment: FINAL INSPECTION/W/O RELEASE

Job Completion



mf 08-05-06

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

DART AEROSPACE LTD		Work Order: 38571
Description: Crosstube Assembly (205/212/412 High Fwd)		Part Number: D212-664-141
Inspection Dwg: D212-664-141 Rev: C		Page 1 of 1

FIRST ARTICLE INSPECTION CHECKLIST

☒ First Article
 ☐ Prototype

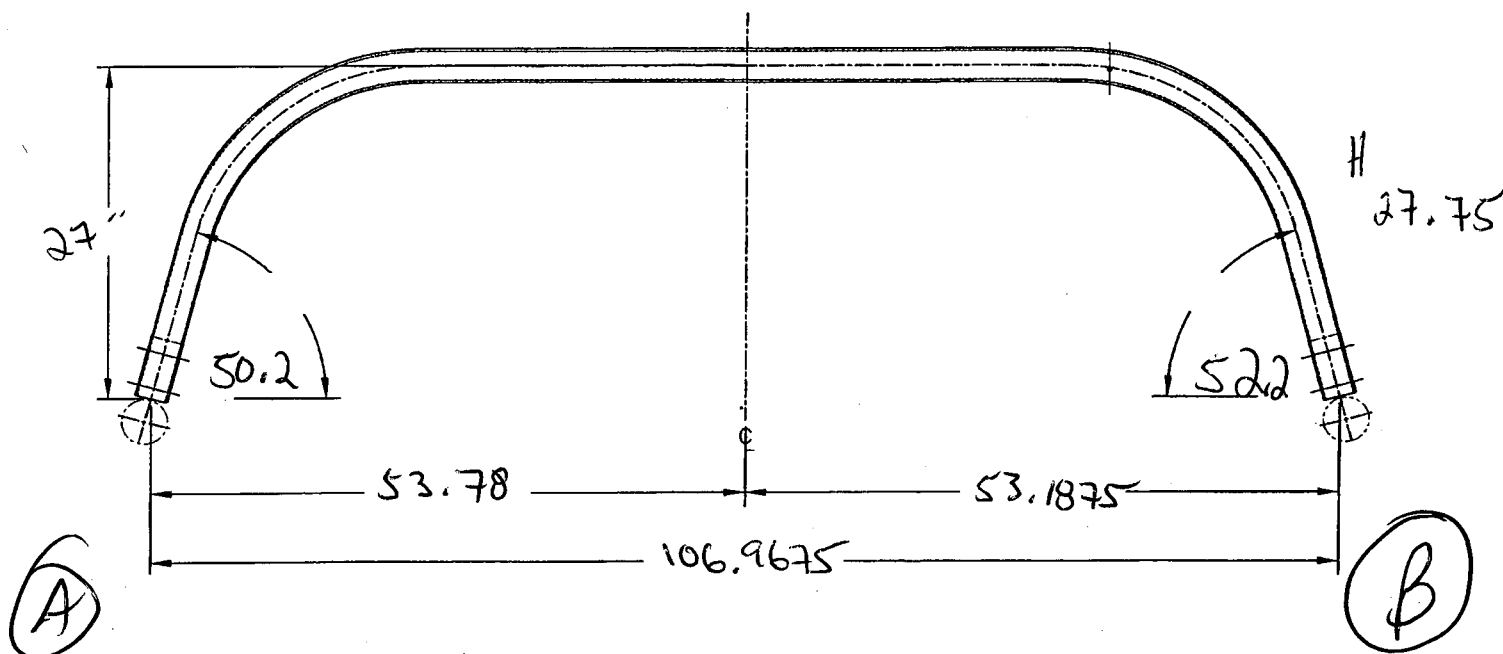
Inspection Sheet Drawing Dimension	Tolerance	Actual Dimension	Accept	Reject	Method of Inspection	Comments
SIDE A	0.200	+/-0.010				
	R0.063	+/-0.010				
	2.740	+0.005/-0.000				
	5.097	+/-0.030				
	2.304	+0.005/-0.000				
	2.340	+0.005/-0.000				
	2.398	+0.005/-0.000				
	2.448	+0.005/-0.000				
	2.498	+0.005/-0.000				
	2.549	+0.005/-0.000				
	2.599	+0.005/-0.000				
	2.671	+0.005/-0.000				
	2.701	+0.005/-0.000				
SIDE B	0.200	+/-0.010				
	R0.063	+/-0.010				
	2.740	+0.005/-0.000				
	5.097	+/-0.030				
	2.304	+0.005/-0.000				
	2.340	+0.005/-0.000				
	2.398	+0.005/-0.000				
	2.448	+0.005/-0.000				
	2.498	+0.005/-0.000				
	2.549	+0.005/-0.000				
	2.599	+0.005/-0.000				
	2.671	+0.005/-0.000				
	2.701	+0.005/-0.000				
	126.51	+/-0.020				

Measured by:		Audited by:		Prototype Approval:	N/A
Date:		Date:		Date:	N/A

Rev	Date	Change	Revised by	Approved
A	05.04.27	New Issue (P/O D412-664-101)	KJ/JLM	
B	06.03.15	Tolerance revised for 5.097 per Dwg Rev update	KJ/JLM	
C	07.05.28	Dwg Rev updated	KJ/JLM	

DART AEROSPACE LTD		Work Order:	38571
Description: Crosstube High Fwd (205/212/412)		Part Number:	D212-664-101
Inspection Dwg: D212-664-141 Rev: C		Page 1 of 1	

Required Dimension	Min	Max
Height	26.79	27.05
1/2 Span	53.59	53.85
Angle	49	52
Total Span	107.18	107.7



Comments
Tube is 0.5325" over bent, and 0.83" too high on side B, both dims from nominal!
Tube is scrap.

QC15 Inspection	
Date	

Rev	Date	Change	Revised by	Approved
A	07.02.06	New Issue	KJ/JM	
B	07.05.31	Dimensions updated per Dwg Rev C	KJ/JM	

DART

DESIGN PH	DRAWN BY PH	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
CHECKED QP	APPROVED [Signature]	DRAWING NO. D212-664-141	REV. C SHEET 1 OF 3
DATE 07.03.08		TITLE XTUBE ASS'Y (205/212/412 HI FWD) NTS	
A	00.12.12	NEW ISSUE	
B	05.02.04	ADD HOLES FOR COMPATABILITY WITH BHT/AA SKIDTUBES	
C	07.03.08	REMOVE -851 ABRASION STRIP; ADD MAGNOBOND 6398, CUSHION, REVERSE CLAMPS	

RELEASED07.04.24 **[Signature]**

Qty	Part Number	Description
X	D212-664-141	CROSSTUBE ASSEMBLY (205/212/412 HIGH FWD)
1	D6005-128	CROSSTUBE
2	D2893-1	SUPPORT
4	D3595-063-450	RUBBER CUSHION
4	MS21920-25	CLAMP (OR MS21920-26)
A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947-100, TYPE II, CLASS 2 ADHESIVE)

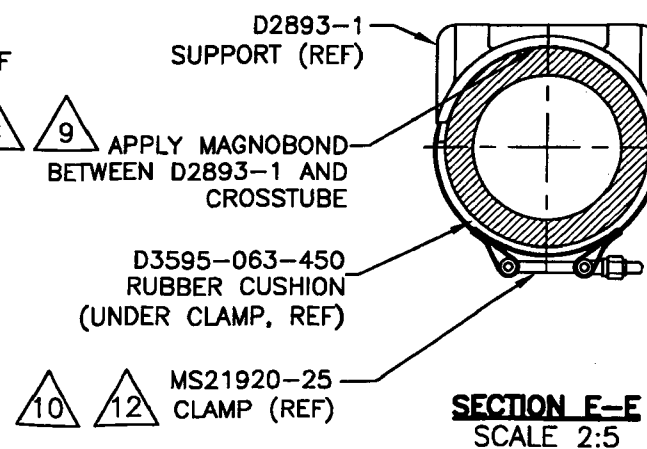
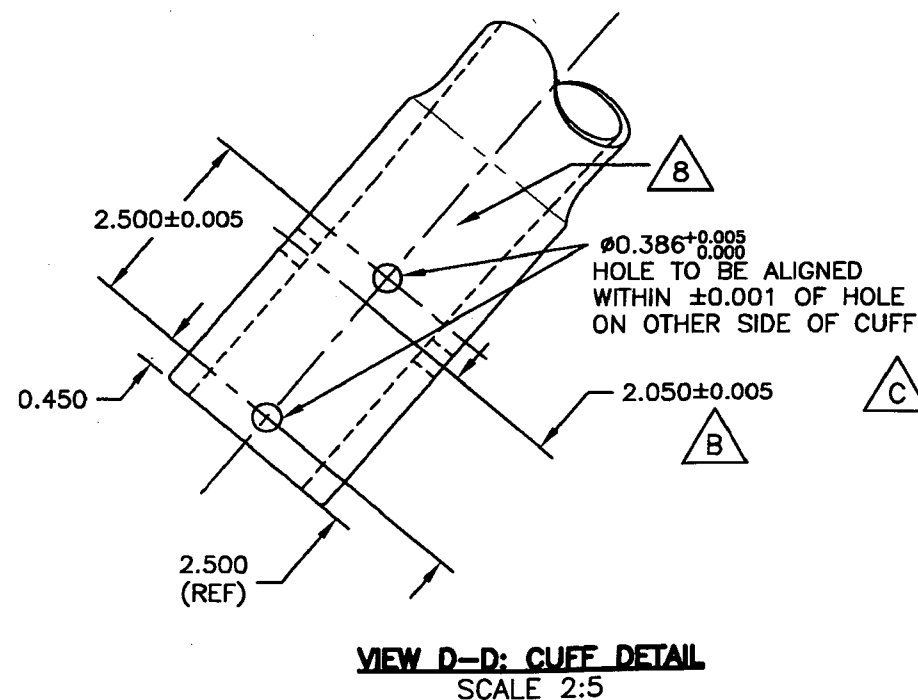
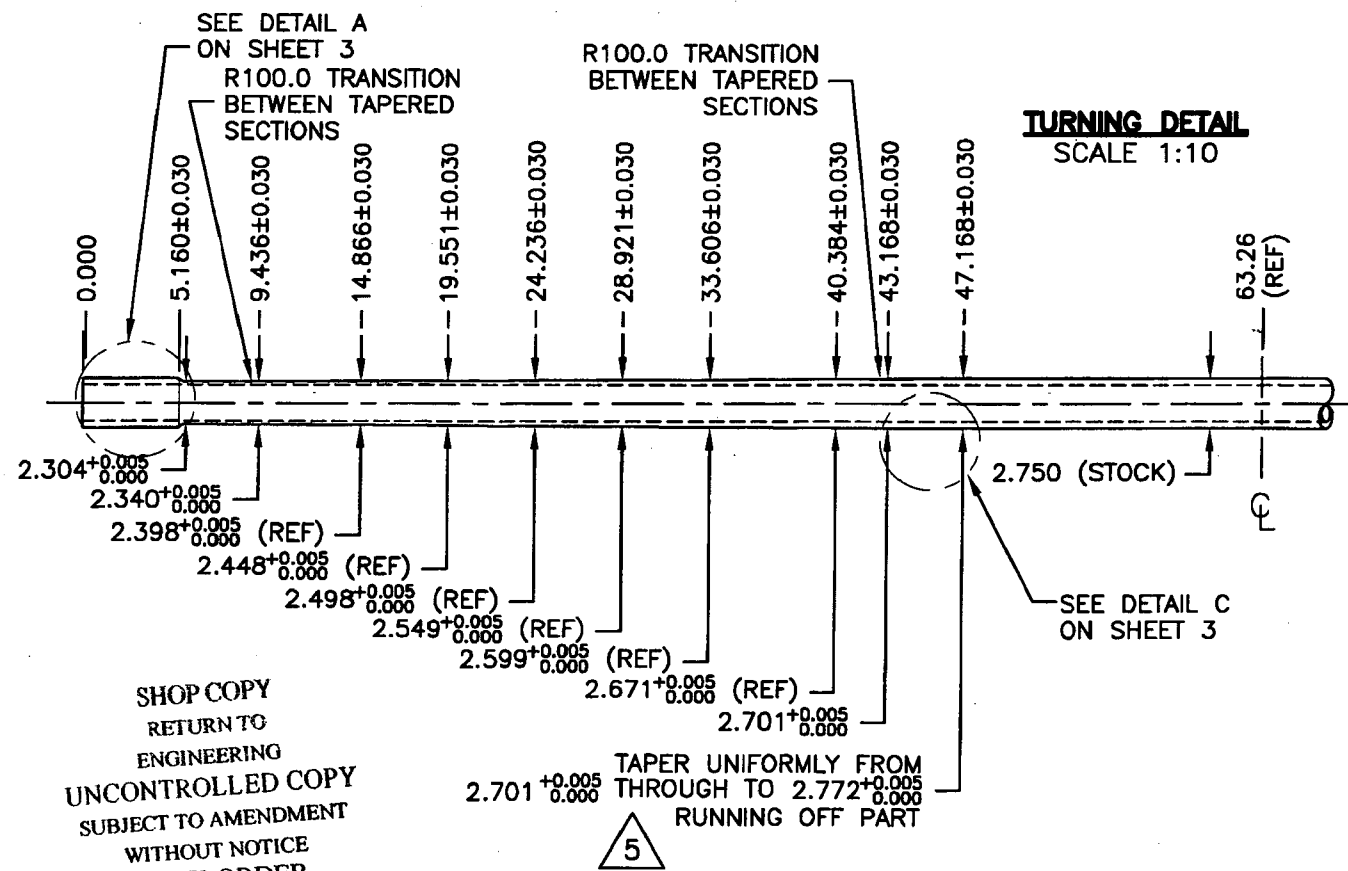
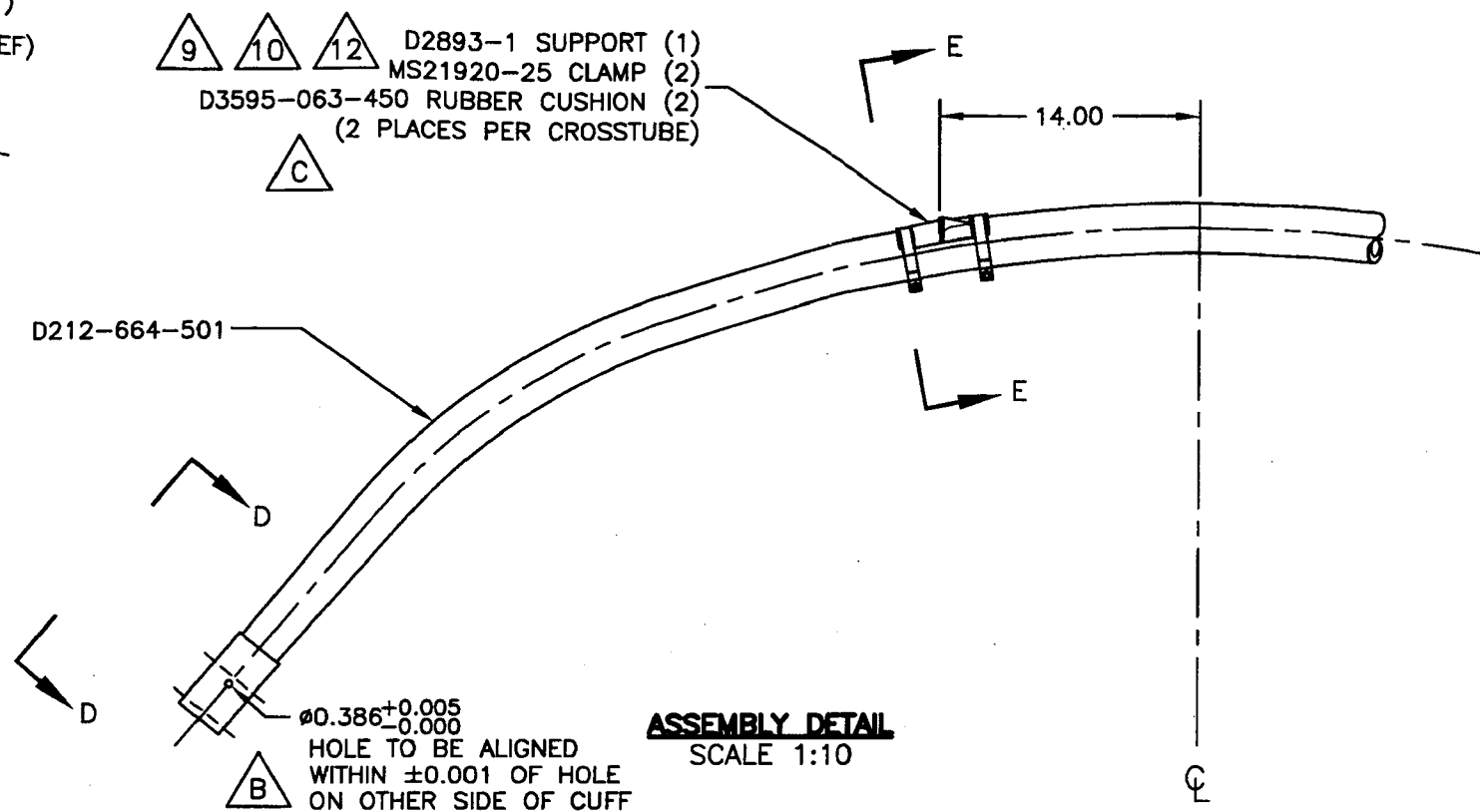
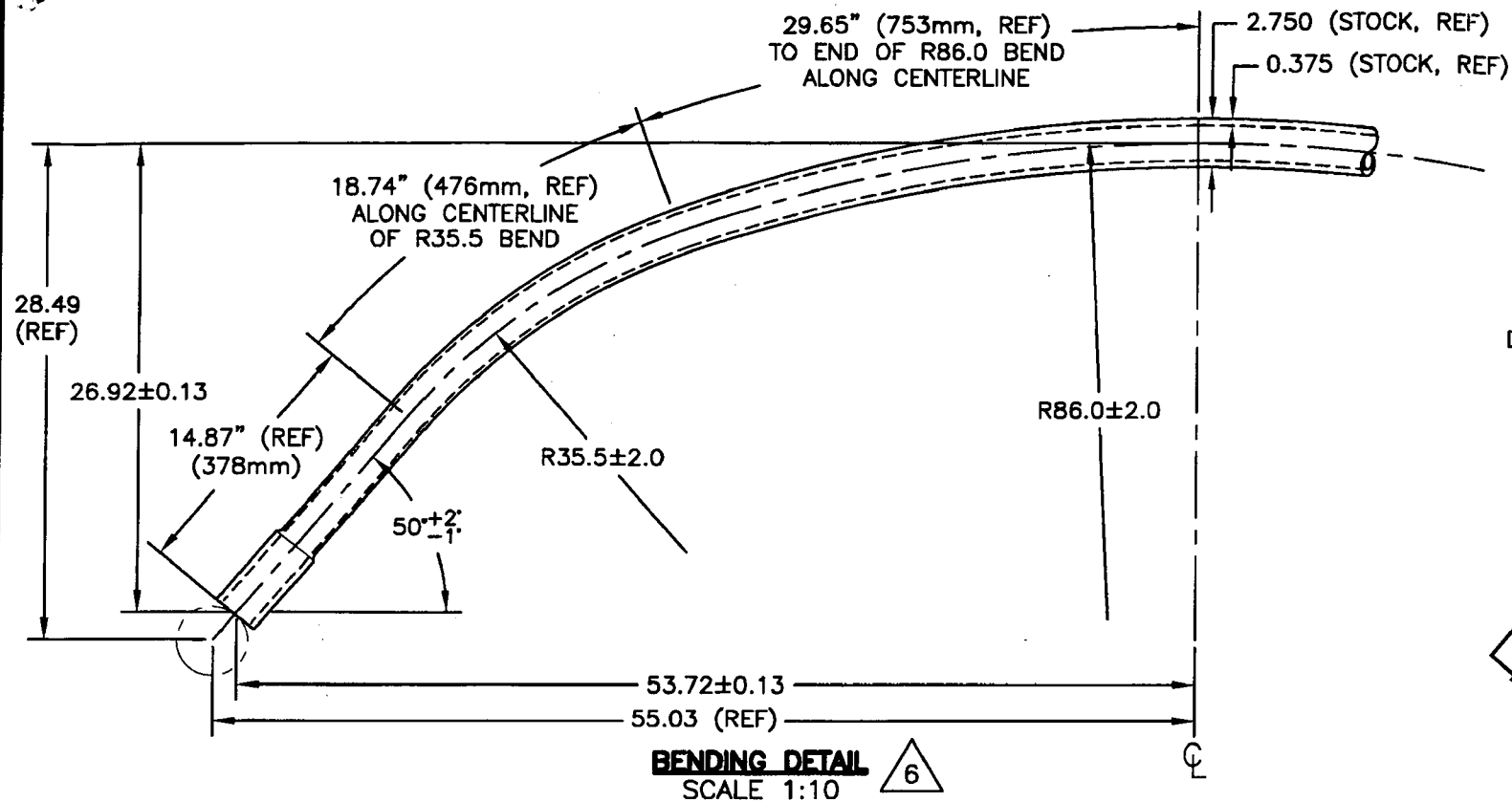
GENERAL NOTES:

- 1) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 2) MATERIAL: MANUFACTURED FROM D6005-128
FINISHED LENGTH = 126.51 ± 0.020
- 3) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART QSI 005 4.2
- 4) PART IS SYMMETRIC ABOUT CENTERLINE.
- 5) RUN-OFF PART. BLEND OUT EDGE LONGITUDINALLY, TRANSITION SHOULD BE SMOOTH.
- 6) BEND PROGRESSIVELY WITH A MINIMUM OF 3 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D.
- 7) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.
- 8) SCRIBE DART PART NUMBER AND BATCH NUMBER IN THIS AREA WITH VIBRATING STYLUS.
- 9) INSTALL D2893-1 SUPPORT USING 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 PER QSI 015. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
- 10) INSTALL MS21920-25 CLAMPS (OR -26) WITH D3595-063-450 RUBBER CUSHIONS TO SECURE THE D2893-1 SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMPS ARE OPPOSITE OF CROSSTUBE SUPPORT
- 11) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.
- 12) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

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RELEASED

07.04.24

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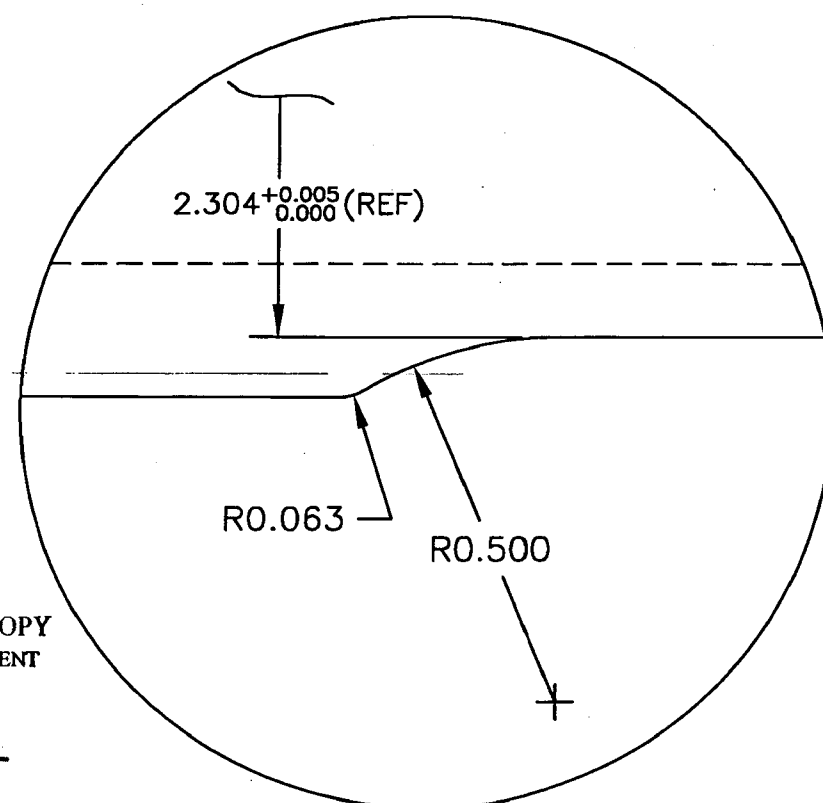
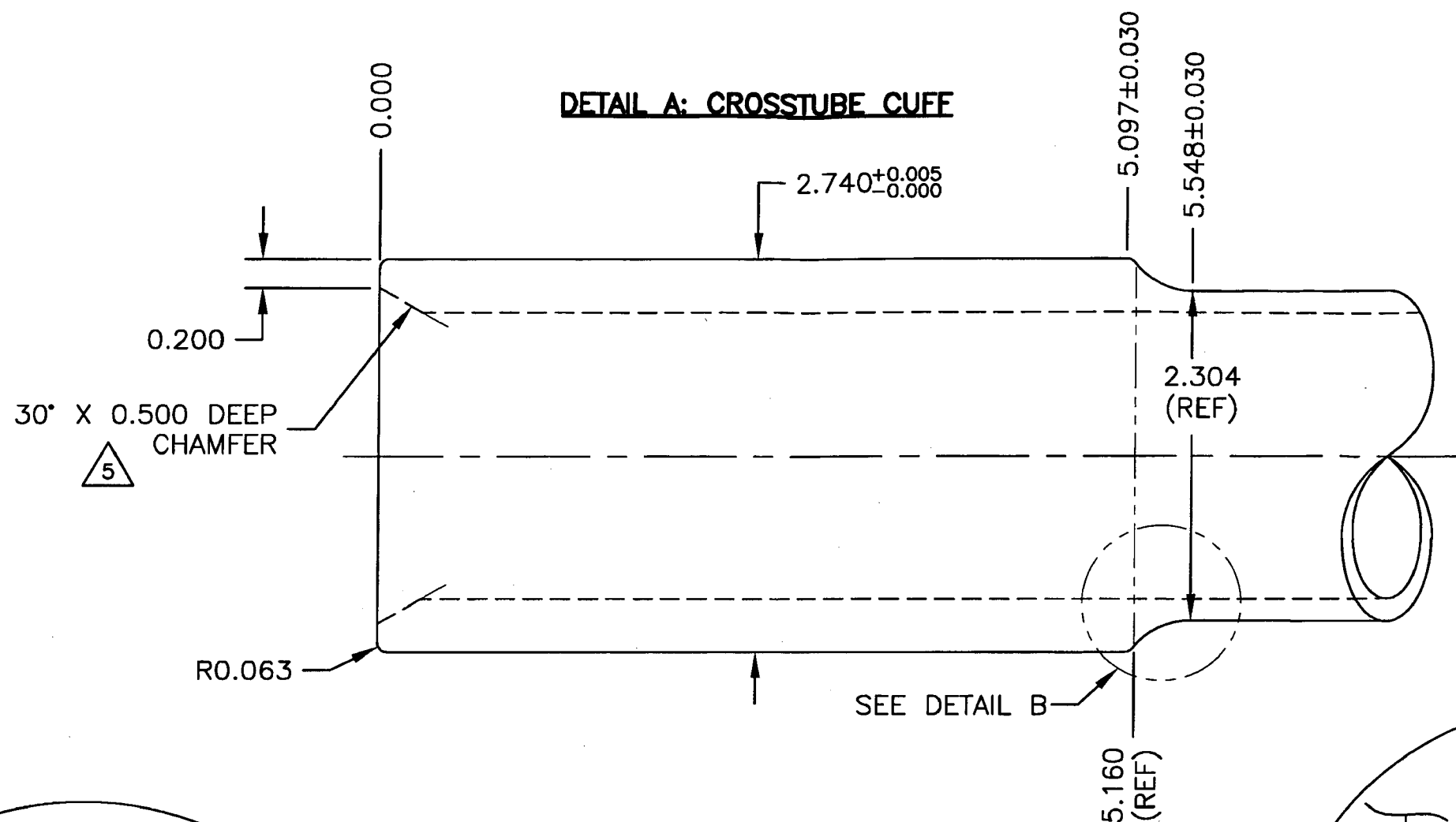
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DESIGN	PH	DRAWN BY	PH	DART	DART AEROSPACE LTD. HAWKESBURY, ONTARIO, CANADA
CHECKED	GP	APPROVED	H	DRAWING NO.	REV. C
DATE	07.03.08	TITLE	XTUBE ASS'Y (205/212/412 HI FWD)	D212-664-141	SHEET 2 OF 3
		SCALE	1:10		

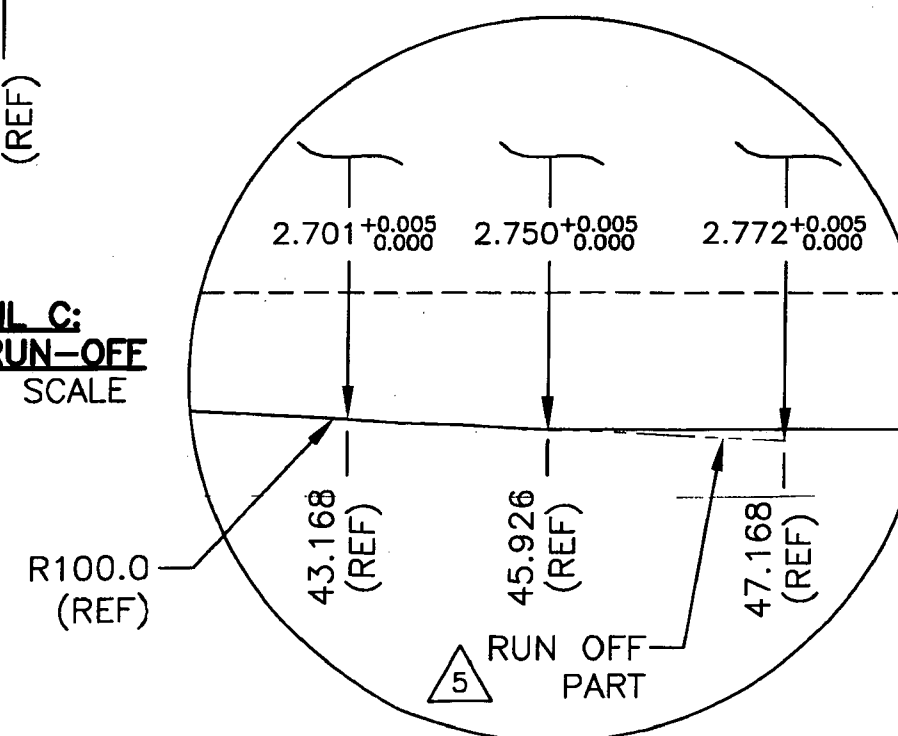
RELEASED
 07.04.24 (P)
 PER EEN 383

DETAIL A: CROSSTUBE CUFF



DETAIL B: CUFF TRANSITION
 SCALE 4:1

DETAIL C: TAPER RUN-OFF
 NOT TO SCALE



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DESIGN PH	DRAWN BY PH	DART	DART AEROSPACE LTD. HAMMERSBURY, ONTARIO, CANADA
CHECKED A	APPROVED [Signature]	DRAWING NO. D212-664-141	REV. C SHEET 3 OF 3
DATE 07.03.08	TITLE XTUBE ASS'Y (205/212/412 HI FWD)	SCALE 1:1	